



The benefits that (only) capital can see? Resource access and degradation in industrial carbon forestry, lessons from the CDM in Uganda

Karin Edstedt^b, Wim Carton^{a,*}

^a Lund University Centre for Sustainability Studies (LUCSUS), Lund University, Sweden

^b Department of Human Geography, Lund University, Sweden



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ABSTRACT

Recent research has shed light on the various tradeoffs involved in carbon forestry, i.e. the pursuit of international forestry projects to help mitigate climate change. This article contributes to these debates by highlighting the importance of resource quality and degradation in evaluating project benefits and tradeoffs. Focusing on the case of an industrial tree plantation in Uganda, the Kachung Forest Project, we highlight how the livelihoods of communities surrounding the reserve have been affected by interlinked changes in local resource access and resource quality. We show that the project has brought about a significant degradation of fuelwood sources, grazing and cultivation lands, and potentially increased pressure on scarce water sources, which in turn contributed to increased poverty in the area. We also argue that the community development interventions that project actors have pursued have primarily delivered ‘benefits that capital can see’, quick-fix solutions that fit within the profit-maximizing logic in which the forest company operates, while obscuring the underlying and resource-dependent drivers of poverty. Our study calls for closer attention to the interlinked socioecological changes underpinning the foundational tradeoffs – between cost-effective carbon sequestration and long-term environmental and developmental objectives – in the industry forestry model analysed here.

1. Introduction

Afforestation and reductions in deforestation and forest degradation are promoted as some of the most straightforward and cost-effective ways to help mitigate climate change (Griscom et al., 2017). International ‘carbon forestry’ projects, pursued through policy mechanisms such as the Clean Development Mechanism (CDM) and programs to reduce emissions from deforestation and forest degradation (REDD+), are some of the clearest examples of this. Underpinning this approach is the idea that meaningful and cost-effective emission reductions can go hand in hand with a number of co-benefits, ranging from the protection and enhancement of biodiversity, improved flood control and soil fertility (Griscom et al., 2017; Jindal et al., 2008), to infrastructure development, new employment opportunities and access to alternative income sources for local project participants (Gong et al., 2010; Reynolds, 2012). A by now extensive literature however shows that these promised co-benefits often fail to materialize, that they tend to be unevenly distributed, or that projects instead end up affecting local communities in a negative way. While critics acknowledge that local benefits are possible, they point out that these are anything but self-evident and inevitably involve tradeoffs, concerns and risks that are

insufficiently recognized by project proponents (Andersson and Carton, 2017; Corbera and Martin, 2015; Leach and Scoones, 2015a).

In making this case, much of the critique of carbon forestry has focused on questions of dispossession and privatization, illuminating the restrictions that projects tend to impose on local land and resource use (Lyons and Westoby, 2014a; Wittman and Caron, 2009), participants’ time and labour (Carton and Andersson, 2017; Osborne, 2011), and resulting conflicts over customary property rights and tenure systems (Nel, 2017; Nel and Hill, 2013; Osborne, 2015). Studies also find large inequalities in how costs and benefits in carbon forestry are distributed (Corbera and Friedli, 2012; Tienhaara, 2012; Wittman et al., 2015) and highlight how project conditions affect dynamics of participation and exclusion (Corbera et al., 2007; Corbera and Brown, 2010; Osborne and Shapiro-Garza, 2018). The literature in this way paints a comprehensive picture of the different factors that shape access to, and exclusion from, land, resources, and project benefits in carbon forestry. Yet as Leach and Scoones (2015b) point out, rural populations are not just being dispossessed but are also increasingly embedded in global market dynamics that come with a range of sometimes more subtle changes and consequences. Questions of resource quality and resource degradation are an important aspect of these, yet have so far received

* Corresponding author.

E-mail address: wim.carton@lucsus.lu.se (W. Carton).

comparatively little attention, despite tying in with long-standing themes in political ecology and the environmental justice literature (Robbins, 2012). Scholars for example commonly mention the negative effects of monoculture plantations focused on exotic tree species (Jindal et al., 2008; Lyons and Westoby, 2014a; Tienhaara, 2012), but often do so in cursory way without exploring the full implications for local livelihoods.

This article argues that closer attention to the political ecology of resource degradation, and how this ties in with dynamics of dispossession and promises of community benefits, is crucial for understanding carbon forestry interventions, and for substantiating when and how tradeoffs occur. We advance this argument through a case study of the CDM-registered Kachung Forest Project (KFP) in Uganda, an industrial carbon forestry project run by the Norwegian-registered forest company Green Resources. In placing changes in rural landscapes and resource-dependent local livelihoods in the center of analysis, our objective here is to weigh project aims against local experiences. We thus scrutinize the specific ways in which resources and livelihoods have been transformed through KFP and assess how this ended up shaping project outcomes. To extend our focus beyond questions of dispossession and benefit distribution, the analysis is structured around three resources that are both central to local livelihoods and significantly affected by the project, namely land, water and firewood. This analysis is in turn framed within a broader discussion on the political ecology of carbon forestry, allowing us to bring out the wider political and justice dimensions of the changes in resource use that we identify. We suggest that this approach allows closer attention to the multifaceted and often subtle ways in which projects alter landscapes and livelihoods and therefore helps illuminate a wider range of justice concerns than that afforded, for instance, by an exclusive focus on processes of dispossession. As such, our analysis helps substantiate the various ‘tradeoffs in carbon commodification’ (Osborne, 2015) that result from the simultaneous and contradictory pursuit of cost-effectiveness and local sustainable development and that, we argue below, are particularly evident in the case of large-scale, industrial forestry projects.

The following section briefly summarizes the literature on carbon forestry tradeoffs, the role of resource degradation within that, and its specific relevance to large-scale, industrial operations. We then offer a quick overview of KFP and previous studies of it, before analyzing the main ways in which the project has affected livelihoods in the communities surrounding the plantation. In the discussion we argue that the alteration of local landscapes caused by the implementation of a monoculture plantation based on fast-growing, exotic tree species has in direct ways degraded the resources that local communities depend on for their subsistence, and as a consequence negatively affected their living standards and food security. We characterize the community benefits that are provided through the project as ‘benefits that capital can see’, highlighting how they ignore the crucial role that local resources play and thereby primarily represent Green Resources’ perspectives on economic development, rather than those of the community itself. The conclusion summarizes the argument and reflects on the need for KFP funders to engage with the inevitable tradeoffs of carbon forestry.

2. Of ‘win-wins’ and tradeoffs in carbon forestry

The promise of ‘win-win’ solutions in development and environmental protection has been a mainstay of projects at least since the so-called ‘integrated conservation and development projects’ (ICDP) of the 90s and 2000s (Christensen, 2004; Muradian et al., 2013). It continues to be a dominant narrative today, not just in carbon forestry initiatives but more generally in the ongoing promotion of ‘payments for ecosystem services’ (PES) (Corbera, 2012; Gupta, 2012; Howe et al., 2018; Muradian et al., 2013). Critics have long argued that this narrative obscures or at least downplays inevitable tradeoffs and incompatibilities between conservation and development goals (Adams

et al., 2004; Muradian et al., 2013). As Howe et al. (2018) point out, any project involves ‘choices about the degree of ecosystem transformation accepted and the balance of local control’ (p. 6), which implies negotiations, compromises and potential disagreements between different stakeholders. All too often however, ‘win-win’ promises are based on wishful thinking and broad generalizations poorly grounded in local socioecological realities, rather than reflecting an understanding of the linkages between conservation and development as necessarily ‘dynamic and locally specific’ (Adams et al., 2004, p. 1147). This easily leads to projects that are ‘overambitious and under-achieving’ (p. 1147) and that consequently risk failure and/or bring about negative consequences for communities involved (Adams et al., 2004).

The carbon forestry literature mirrors this critique by elucidating the various tensions and conflicts in the combined pursuit of carbon sequestration, forest conservation and socioeconomic development. Leach and Scoones (2015b) for example argue that carbon forestry by definition inserts people and landscapes in global discourses and practices that are fundamentally unequal. It ‘restructure[s] ecologies, livelihoods and relationships between people, land and resources’ and as such ‘transform[s] landscapes in particular directions’ (p. 5), a process that inevitably engenders injustices and contradictions. The different actors brought together in international forestry projects come with their own interests and priorities, and it would be naïve to think that these easily align or are always compatible. Rather than flaunting ill-conceived win-win scenarios, Leach and Scoones argue, more attention needs to be paid to the political nature of forestry interventions and the resulting creation of both winners and losers. The inequalities and injustices referred to here are borne out in everything from the uneven distribution of benefits and revenues from project funding (Tienhaara, 2012; Wittman et al., 2015), the often selective, inaccurate and simplistic degradation narratives that projects are based on (Hajdu and Fischer, 2017; Nel, 2017), uneven opportunities for participation in project design and implementation (Hendrickson and Corbera, 2015; Peskett et al., 2011), to evidence of violence, eviction, dispossession or the criminalization of, and exclusion from traditional subsistence activities (Bond et al., 2012; Cavanagh and Benjaminsen, 2014; Fischer et al., 2016).

Specific tradeoffs and contradictions can be articulated for the subset of forestry projects that operate on the carbon market. The aim with these projects is not (just) to combine forest conservation and climate change mitigation with socioeconomic development, but to provide emission reduction options that are cost-effective and attractive to private capital investments (Böhm and Dabhi, 2009; Corbera and Martin, 2015; Leach and Scoones, 2015a). Commonly described as an instance of the ‘commodification of nature’, a number of critiques have been formulated against this approach. Bringing forest carbon onto the market necessitates instrumental and monetary forms of valuation and the simplification of socioecological relations by way of abstraction, quantification and measurement in order to make exchange possible (cf. Castree, 2003). Hence, to create forms of carbon sequestration ‘that capital can see’ (cf. Robertson, 2006), the entangled social and ecological functions of forest ecosystems need to be submitted to accounting and valuation systems primarily concerned with the marketization of carbon stocks (measured in tonnes of CO₂ (tCO₂)), in the process abstracting from the wide variety of other functions and alternative socioecological futures that designated forest areas represent (Nel, 2017). Since projects are constrained by the conditions of the carbon market, this often results in scarce funding being used to prioritize the creation of (cost-effective) carbon offsets, while considerably less resources go to the kind of long-term and sustained community support that would be necessary to realize promised socioeconomic benefits (Andersson and Carton, 2017; Corbera and Friedli, 2012; Fisher, 2013). To the extent that communities themselves are enrolled in forestry projects, this often also means a reorganization of local livelihoods in line with more market-oriented activities (Carton and Andersson, 2017; Osborne,

2011).

There is, then, at least a tendential tradeoff between cost-effectiveness/commodification, carbon sequestration and the pursuit of socioeconomic development in (market-based) carbon forestry projects. At the same time of course, the existence of tradeoffs by itself need not imply negative consequences for involved communities. Some projects are clearly more benign or successful than others, and therefore *can* bring real benefits for (some) local participants, including new sources of income (Jindal et al., 2008; Osborne and Shapiro-Garza, 2018), infrastructure developments (Gong et al., 2010) or access to knowledge and/or forest resources (Corbera and Brown, 2010). While concerns can be articulated for all types of carbon forestry, key differences clearly matter. The literature thus suggests that the degree to which projects are adapted to local political, socioeconomic and environmental conditions is highly consequential for how projects play out. Whether projects work with, against, or separated from local ecologies, existing tenure systems, leadership structures and wider social and cultural institutions directly influences the kind of outcomes they generate (Corbera and Friedli, 2012; Gong et al., 2010; Reynolds, 2012; Thomas et al., 2010). Similarly, projects that allow a significant degree of local participation in project design and implementation are more likely to be seen as legitimate and therefore to result in more positive outcomes (Corbera, 2012). In many cases, however, opportunities for participation turn out to be limited and questions of procedural justice are not taken seriously, which has been of particular concern in the CDM (Corbera et al., 2007; Corbera and Jover, 2012). Often, local populations are not even fully informed about the kind of markets that their landscapes and livelihoods are being enrolled in (Corbera and Martin, 2015; Leach and Scoones, 2015a; Twyman et al., 2015).

Osborne and Shapiro-Garza (2018) usefully synthesize these dynamics by focusing on degrees of commodification and market embeddedness in carbon forestry. They draw on the work of Karl Polanyi (2001), who argued that the negative consequences of commodification derive from the economic need to dis-embed ‘fictitious commodities’ like land, labour and money from their surrounding social, environmental and institutional contexts, and instead subordinate them to the narrow set of economic institutions that enable a functioning market. Pursuing this line of thinking, Osborne and Shapiro-Garza analyze two community-based projects in Mexico and suggest that projects with a higher degree of embeddedness in local institutions are more likely to yield community benefits than those firmly integrated in global carbon markets. Their analysis invokes the idea of a sliding scale along which one set of tradeoffs occurs: more commodification corresponding to the prioritization of cost-effectiveness and the interests of global actors, while more embeddedness implies a greater concern for community development and a comparatively lesser preoccupation with cost-effectiveness and global environmental agendas. In this framework, an embedded approach to carbon forestry does not do away with environmental and socioeconomic tradeoffs, but enables a fairer share of benefits for local communities and guarantees that local actors have a meaningful voice in deciding what is being traded off.

It is worth considering the implications of this for large-scale, industrial carbon forestry plantations, of which our case study here is an example. The literature consistently shows these to be the most problematic forestry project type, characterized by opaque and exclusionary decision-making structures that offer no or at best marginal opportunities for local participation, the capture of carbon funding by international companies, a reliance on monoculture plantations of exotic and poorly adapted tree species and poor labour conditions (Corbera and Friedli, 2012; Jindal et al., 2008; Lyons and Ssemwogerere, 2017; Nel, 2017; Tienhaara, 2012). Extending Osborne and Shapiro-Garza’s argument, one could argue that this reflects a degree of dis-embeddedness that exceeds that of many community-based carbon forestry projects. Indeed, industrial tree plantations are integrated not just in carbon markets but also (and perhaps primarily) in global timber markets, which means they are explicitly focused on the

maximization of timber production and arguably operate under a tighter set of market conditions than projects that are not. For Asiyambi (2016), it is these ‘more-than-carbon political economies’ (p. 154) of for example timber extraction that tend to produce the most immediate and detrimental consequences for communities.

Given the nature of the double commodification that underpins industrial carbon forestry, then, considerable tradeoffs can be expected with community development and environmental objectives. While seldom an explicit focus of the carbon forestry literature, it seems clear that resource quality and processes of resource degradation feature prominently in how these tradeoffs play out. Political ecologists have long highlighted the close connection between rural livelihoods and resource use, as for example in the degradation and marginalization thesis, which states that otherwise benign production systems tend towards the degradation of local environments when resource users become marginalized as a consequence of social disruption (Robbins, 2012). One can however imagine other interactions between degradation and marginalization as well. As Huber (2015) points out for energy developments, communities that are not physically displaced will tend to suffer “the slow violence of landscape destruction, water contamination, and livelihood disruptions” (p. 330). In the case of industrial forestry as well, resource degradation enters the picture primarily as a *direct consequence* of project activities and thereby as a *possible driver* of marginalization. In other words, whereas concerns for dispossession and resource access tend to focus on the political and socioeconomic conditions that shape communities’ ability to benefit from resources (Ribot and Peluso, 2003), closer attention to resource degradation helps elucidate the fundamental socioecological dimensions of forest interventions, that is, the way in which communities’ ability to benefit from resources is always already mediated by ecological conditions - conditions that are highly vulnerable to the reworking of landscapes and resources by external actors. Dispossession and degradation are therefore best considered together. In the remainder of this article, we turn to our case study and examine how these intertwined processes unfold in the Kachung Forest Project.

3. The Kachung Forest Project: history and context

KFP is an afforestation project of 2099 ha in Dokolo district, Uganda. It is operated by the Norwegian forestry company Green Resources and is situated within one of Uganda’s Central Forest Reserves (CFR), government-owned land designated for forestry that has been leased to the company. Registered as a project under the CDM in 2011, KFP is meant to run for a total of 60 years (Green Resources, 2012, 2017). The project consists of an industrial tree plantation dominated by fast-growing pine (*Pinus Caribaea*) and a lesser (9%) component of eucalypt (mostly *Eucalyptus grandis*) (Green Resources, 2012; Hardy and Whittington-Jones, 2017), both of which are used for the production of sawlogs and utility poles (Green Resources, 2017). Carbon credits from the project are owned by Green Resources and sold to the Swedish Energy Agency (SEA) as part of a 30-year agreement that is meant to deliver a total emission reduction of 365,000 tCO₂e (Green Resources, 2012; SEA, 2016). In addition, and in line with prevailing ‘win-win’ narratives, KFP is meant to facilitate socioeconomic development through the ‘promotion of tree planting/afforestation activities in the local communities,’ which involves handing out pine seedlings to individual households so that they can establish woodlots on their own land. Other listed benefits include the ‘provision of employment opportunities’ in the forest plantation, and using 10% of carbon credit revenues for the development of ‘local infrastructure including roads, health centers, water supply and communication systems’ in surrounding villages (Green Resources, 2012, p. 3). Green Resources (2012) in this way claims to ‘contribut[e] to mitigating climate change while meeting the growing demand for quality wood products from well managed plantation forests and contributing to sustainable environmental management, community development and poverty

alleviation in Uganda' (p. 2).

As with other CFRs in Uganda and questions of land use and ownership in sub-Saharan Africa more generally (Carmody and Taylor, 2016), the history of the Kachung reserve is complex and tied in with decades of political instability, persisting colonial institutions and legacies, neoliberal reforms and overlapping statutory and customary land tenure systems (Gebremichael, 2016; Lyons and Westoby, 2014a). The significance of these histories is often overlooked by carbon forestry actors, which in various cases has led to conflicts with local communities (Cavanagh and Benjaminsen, 2014; Nel, 2017). In the case of Kachung, the area was used by communities in one way or another long before it was first gazetted. People relied on (parts of) the area for cultivation, but also for firewood, construction materials, charcoal production, livestock grazing, honey production, hunting and cultural activities (Gebremichael, 2016; own interviews). This was partly condoned (and actively encouraged during the Idi Amin regime) by the government until 2003, when the National Forestry and Tree Planting Act institutionalized the pursuit of a profit-driven forestry model and in the process made it illegal to pursue any of the above activities in CFRs, except for the collection of firewood (Hardy and Whittington-Jones, 2017; NFA, 2003). While evictions had to some degree happened long before Green Resources leased the land in 1999, the start of the company's activities marked the moment for the National Forestry Authority (NFA) to clear the area and expel local communities from the reserve. This involved considerable violence, with people initially refusing to leave. Crops were uprooted, some people were beaten and others arrested for attempting to mobilize against the evictions. The forest project continues to be resented and to some degree contested by those affected (Lyons and Ssemwogerere, 2017; Lyons and Westoby, 2014b). As of 2016, there were at least two ongoing court cases against Green Resources, one of which involving over 300 community members who claim ownership of land within the KFP (Green Resources, 2016).

Despite evidence of the conflicts involved, Green Resources and SEA long downplayed concerns about the negative livelihood outcomes associated with the evictions. They did so by highlighting the illegal nature of 'encroachment' in forest reserves, essentially passing on responsibility to the Ugandan government (Fischer and Hajdu, 2017; Lyons and Ssemwogerere, 2017). When a Swedish TV documentary in 2015 however called out SEA on conditions in Kachung, this brought considerable media attention to the evictions and the largely unfulfilled promises of the plantation's socioeconomic benefits (Fischer and Hajdu, 2015; Kalla, 2015). SEA acknowledged these concerns and decided to freeze payments to Green Resources until the company could demonstrate considerable improvements for local communities (SEA, 2016). The points of intervention that Green Resources was tasked with (mainly consisting of the requirement to fulfill earlier promises) include the promotion of energy-efficient cooking stoves, the assessment of changes in communities' socioeconomic situation, 'enhancing awareness' of land ownership and plantation boundaries, implementing agricultural improvements to enhance food security, and establishing better 'communication and grievance mechanisms' (Hardy and Whittington-Jones, 2017). Note that these demands still fail to acknowledge the role that reduced land access has played in the deteriorating livelihood situation of people surrounding the plantation, and therefore reflect what Fischer and Hajdu (2017) identify as the 'rendering technical' of poverty in KFP, a form of 'anti-politics' (cf. Nel, 2017) defined by the idea that complex socioeconomic and political problems 'can be 'fixed' [...] by providing e.g. temporary jobs in the plantation or energy-efficient stoves' (Fischer and Hajdu, 2017, p. 8).

Our analysis complements this perspective by examining how the project has affected local resource quality, putting promises of local community benefits in context. As we argue below, our findings significantly complicate continued assertions by Green Resources and SEA that responsibility for the deterioration in local livelihoods primarily lies with the Ugandan government. The analysis is based on fieldwork in Kachung during a 10-week period between January and March 2017,

mostly carried out by the first author. Fieldwork was focused on six villages (of 19 mentioned in the Project Design Document (PDD)¹), chosen to reflect a geographical distribution among those closest to the plantation and therefore likely to have been most affected by the project. It consisted of observations, 31 semi-structured interviews with community members as well as nine interviews with community leaders, a staff member at one of the company-funded local health centers, and representatives from Green Resources and the NFA. Community members were selected through a combination of purposive and snowball sampling to strike a balance between women and men, and younger and older respondents that have been exposed to the project to varying degrees. Interviews were complemented with an analysis of project documents and a review of the published results (summarized above) from previous studies on the project.

4. Trading off resource access and resource quality in the Kachung Forest Project

Over 80% of people in the villages surrounding the plantation are subsistence farmers (Lyons and Ssemwogerere, 2017), illustrating the crucial role of local resources for the provision of everyday needs. We here focus on three of the most important resources, namely land, water and firewood, and how they have been affected by the project. In the discussion we then frame this within a broader discussion of KFP's alleged socioeconomic benefits to communities.

4.1. Land

The most important thing in Africa here is the land. When you have the land, you have everything.²

(Paul, 1/3/2017)

In line with previous research, our interviews show that altered access to land and other resources in the reserve is the single most important way in which local communities have been affected by the project. Prior to being evicted, an estimated 20–40 households (according to interviewees) lived within the boundaries of the CFR, with many more directly depending on it for their subsistence. Interviewees described the reserve as 'a place for survival' (Beatrice, 31/2/2017) and highlighted its multiple uses for hunting, access to water, the collection of firewood and forest products, and income-generating activities such as the production of charcoal, honey and bricks. Respondents also said the land within the reserve was one of the main spaces they used for cultivation, where crops were grown for home consumption and for the market:

I used to cultivate there and get farm products. That's how I could build the house. And take the children to the school. And to the hospital... with the money from farm products.

(Rose, 2/3/2017)

Cattle grazing was common and provided a significant form of income, with people using the animals as a form of insurance against unforeseen circumstances:

Those days when we were grazing animals there, in case of any problems, [I] could sell an animal and solve this problem. If children are going to school, [I] could also sell the animal and take the children to school.

(Beatrice, 31/2/2017)

Conversely, people's eviction from the reserve has led to significant changes in their livelihoods. Many of the community members we

¹ The PDD is an official document within the CDM that contains a detailed description of project objectives and activities. It is on the basis of the PDD that CDM projects are evaluated and approved.

² To guarantee anonymity, all interviewees have been given alternative names.

interviewed indicated that they now have less land, less opportunities to sell crops on the market, and less animals than before, which has directly led to increased poverty and food insecurity:

[We are] starving, right now. There's no money, no food, because the land has been taken. The people are just here. The little land that I'm now using, how can I feed anyone here? This is the little land that I'm now farming [points at the surrounding plot]. No cassava yet. I got to go and hire land somewhere. There's no way out!

(Edward, 8/3/2017)

Interviewees noted that they are now mostly restricted to cultivating around their homesteads and reflected on the implications this has had in terms of land degradation. Land within the forest reserve is described as both fertile and abundant, and the disappearance of cultivation opportunities there has forced farmers to use their remaining land more intensely. People repeatedly remarked that the continuous use of a smaller piece of land had decreased soil fertility. They described their land as 'exhausted' and remarked that the crops had 'no quality' compared to where they used to farm, which further reduced opportunities to sell crops on the market. When describing the implications for their livelihoods, interviewees commonly did not distinguish between reduced access to land and the resulting process of degradation, but the two were clearly seen to reinforce each other. One woman for example said:

Now the harvest is not at all that good, the other place was more fertile. [...] Before [I] could get sacks, now basins. Land is exhausted now, you cannot get anything for the market and you cannot take the children to school. The yield is too poor.

(Mary, 1/3/2017)

Those who reared livestock were affected in similar ways. While Ugandan law prohibits grazing of livestock in CFRs, Green Resources has allowed grazing in mature parts of the plantation, where potential for damage to the trees is lowest. Both interviewees and the project auditors (Hardy and Whittington-Jones, 2017) however note that grazing opportunities in the plantation are in practice limited because the company uses herbicides to kill unwanted vegetation and neither pine nor eucalyptus generally support a lot of undergrowth. Grazing is also still allowed in the wetland area within the plantation, which is not part of the CDM project, but some of our interviews noted that 'the grasses there are not good pastures for animals' (Int. 14), that the area is simply too far away for many people to be of practical use for grazing, or that they are afraid of taking their animals there for fear of being arrested or having their animals confiscated. Some of our interviewees mentioned that they now graze livestock around their homesteads, which has created conflicts with food cultivation and led to more crop damage. Many have been compelled to reduce on the amount of animals they keep.

The audit for the project confirms that the decline in cultivation and grazing opportunities is one of the main concerns raised by community members but also hints at the position that project implementers take on this. The document states that 'communities have reflections that date back prior to the establishment of the [forest plantation] and their perception is a comparison of the two scenarios (before and after plantation establishment)' (Hardy and Whittington-Jones, 2017, p. 15). The document in this way underscores the idea that people occupied the land illegally, that evictions predate the establishment of the plantation and that it is therefore the Ugandan government and not the project actors that are responsible for the dispossession of local resources. While this is technically correct, it puts project actors in the curious position of trying to foster socioeconomic development in the area while all but ignoring the most important driver behind the recent deterioration in people's incomes and food security. It also ignores the fact that the forestry model that excludes local communities from CFR's was implemented with the explicit ambition to attract companies like Green Resources (Lyons and Westoby, 2014a; Nel, 2015), hence that

the company has directly benefited from, and is dependent on, the enforcement of this decision. More to the point, the narrative of SEA and Green Resources neglects the socioecological impacts of the plantation itself, as a distinctively industrial and reductionist form of land use that comes with its own livelihood consequences.

4.2. Water

One of the ways in which KFP promises to deliver community co-benefits is through the 'protection of water sources' and the provision of clean and safe water to communities (Green Resources, 2012). Green Resources has rehabilitated or constructed a total of 8 water sources (4 springs and 4 boreholes) since the start of the project (Hardy and Whittington-Jones, 2017), of which one is inside the plantation. Our interviews show that this is generally appreciated by community members living nearby, even though some respondents complained that promised boreholes in their village have not materialized. However, inhabitants also raise concerns about water quality and the depletion of water resources in and around the plantation (see also Hardy and Whittington-Jones, 2017; Lyons and Ssemwogerere, 2017). A number of interviewees observed that some long-standing water points had dried out that year (i.e. 2017), with one person noting that it was the first time this had happened as far as anyone could remember. Community members in one of the villages just outside the plantation described how the spring in the reserve, used by the plantation nursery as well as community members, had been depleted. While we were present this was illustrated by an SUV from Green Resources coming to take water from a community well, for use in the field office and nursery. According to our interviewees, the depletion of the spring has increased the pressure on remaining water sources, with some community members now needing to move longer distances to collect water.

Some of our interviewees suggested that the water source in the reserve dried out as a direct consequence of the eucalyptus that was planted:

When they came, and brought [the] eucalyptus type of trees... it is a type of trees [that] people [everywhere] complain that they drain water. The type of tree has drained water there.

(Nzenia, 27/1/2017)

It should be noted that Uganda, like other parts of East Africa, suffered a severe drought in 2016 (WFP, 2016) and that dry conditions have prevailed in the wider region. The depletion of water sources is therefore certainly due to a number of factors, drought likely being the most important one. That being said, eucalyptus has a known reputation for affecting the water table because of its deep roots and rapid growth habit (Scott, 2005). In the PDD, Green Resources acknowledges the potential negative effects of the species on local hydrology and proposed to mitigate the risk 'through conserving buffer zones [...] around all wetland areas within the project' and limiting the area planted with eucalyptus to 'less than 20%' (Green Resources, 2012, pp. 93–94). At the moment, the plantation consists of 9% eucalyptus but some of this is adjacent to the water source identified in the PDD as a 'protected spring' of particular importance to local communities. This spring was still dry in the beginning of 2018 and company workers had dug a pond in the wetland nearby to collect water for use in the plant nursery.

Respective of the exact reasons behind the depletion of this spring, the concerns raised by community members here point to a larger issue with the kind of forestry model that Green Resources is pursuing. Indeed, the potential for fast-growing tree plantations to affect local hydrology is not exclusive to eucalyptus. While eucalyptus certainly poses the most serious risks (Jobbágy et al., 2012), pine as well has been shown to lead to a drop in the water table in some areas (Scott, 2005; WRM, 1999), with one study noting that the pursuit of any fast-growing tree plantations for carbon sequestration potentially amounts

to ‘trading water for carbon’ (Jackson, 2005). Or as another hydrologist puts it, ‘[g]rowing trees quickly, something that is implicit in economically successful plantation forestry, is going to cost water; you cannot have one without the other’ (Scott, 2005, pp. 4205–4206). The specific hydrological effects of tree plantations are highly contextual and depend on local climate, soil type, topography, previous vegetation cover and plantation management. In general though, trees, and especially fast-growing trees, require more water than agricultural crops or grasslands, so when the latter are replaced by industrial tree plantations this is bound to decrease existing water reserves (Scott et al., 2005). Conversely, plantations established in areas that were previously forested tend to have a much more limited hydrological effect. Scott et al. (2005) thus note that ‘establishing tree plantations on grass-, scrub-, or croplands whose soils have not become degraded can be expected to lead to more or less serious reductions in soil moisture and, ultimately, groundwater recharge in water yield’ (p. 624), not just in the plantation itself but also in downstream areas. They furthermore note that this is more likely to be the case in climates where native vegetation goes dormant or croplands are left bare under the dry season, but where evergreen trees (like eucalyptus or pine) will continue to require water. Evapotranspiration from plantations can in these cases significantly exceed annual rainfall, indicating that the trees are essentially mining groundwater reserves (Cossalter and Pye-Smith, 2003; Scott, 2005; Scott et al., 2005).

To be clear, it is impossible to evaluate the specific long-term effects of the Kachung plantation on water availability without a detailed hydrological survey, which was not part of our study, nor indeed was one carried out prior to the establishment of the plantation. However, the literature at least suggests that community members’ concerns regarding the negative effects of the plantation on natural water sources should be taken seriously instead of being dismissed as a ‘myth’, as Green Resources did in our interview with them, and that precaution and closer scrutiny seems justified. As the PDD and historical surveys point out, the previous vegetation in Kachung comprised of savannah woodland, which has a different vegetation type and a tree cover that is lower than that of a forest or a plantation (Gebremichael, 2016; Green Resources, 2012), and therefore probably a different groundwater balance. At the very least, Green Resources’ promise to help protect water sources and aid the provision of water to local communities needs to be seen in the context of the water demand from the plantation itself, which as far as we can see has not been the case. Particularly in the context of rapidly accelerating climate change, which some studies suggest is already causing prolonged drought periods in East Africa (Williams and Funk, 2011), a tree plantation that competes with already scarce water sources could have an overall negative impact on communities’ water access.

4.3. Firewood

The vast majority of households around Kachung is dependent on firewood for cooking, which previously was mainly sourced from the forest reserve. The PDD describes this as one of the activities that led to the degradation of the reserve and also one of the intervention areas of the project (Green Resources, 2012). One of the aimed-for co-benefits of KFP is therefore to decrease local firewood use through the promotion of energy-efficient cooking stoves, and to provide alternative firewood (and timber) sources by handing out pine seedlings for farmers to plant on their own land. In our interview with them, Green Resources noted that they have so far given training to 16 community members on how to construct energy-saving stoves from local materials, and that they are handing out 10% of their seedlings to individual households every year. Seedlings are distributed on the basis of a rotation schedule and the company restricts hand-outs to those with sufficient land, so as not to jeopardize food security. Furthermore, in line with Ugandan law, and though there are conflicting reports about the implementation of this rule, firewood collection within the plantation is allowed as long as it is

for domestic purposes only, but only between 8AM and 5PM and ‘in areas that have been subject to pruning and tree thinning’ (Hardy and Whittington-Jones, 2017, p. 21).

Interviewees agreed that the seedlings could be useful, though some complained of being excluded for not having sufficient land, while others said they had actively refused seedlings because they did not think it adequately compensates for the land that they have lost. Several respondents also noted that seedlings have a very low survival rate because they are often given out during the dry season and farmers have limited opportunities to water them. Others remarked that the seedlings are not a reliable source of income because the long wait before the timber harvest means that they are unable to help provide in everyday needs. This confirms conclusions from other studies, namely that the promotion of timber production often does not reflect the needs of smallholder farmers and moreover locks in valuable land for longer periods, thereby reducing people’s flexibility to respond to more immediate and changing priorities (Osborne, 2011). Corbera et al. (2007) note that this especially tends to marginalize women, since they are the ones normally responsible for home gardens and therefore tend to favour more short-term land uses, or indeed different kinds of trees that provide a number of other resources beyond timber (e.g. fruits and firewood). Neikter (2016) draws similar conclusions from her fieldwork around Kachung.

Most significantly though, many of the community members we spoke with suggested that both the quantity and the quality of the firewood they have access to, has declined because of the plantation. The wood that people previously collected from indigenous trees was seen as a high-quality fuel source that was available throughout the year. These preferred trees and shrubs have now become scarce, removed by Green Resources to plant pine and eucalyptus, the branches of which tend to be smaller and thinner than what people used to gather. One man noted:

[The women in the village] used to have big and durable logs. But since there’s nowhere to go and collect it has changed. The company has allowed them to pick the branches, but they do not last that long at all.

(Augustine, 2/2/2017)

Many thus commented on a shortage of good firewood, especially during certain times of the year. Apart from the size of the branches available, it also appears that like most coniferous trees, Caribbean pine (the now dominant species in the reserve) has a density that is lower than that of many native and slow-growing species and therefore burns quicker and is needed in larger volumes to provide the same fuel value. It apparently also does not burn as cleanly, as one woman put it,

The kind of [indigenous] firewood was smart, it did not produce dirt, like charcoal. It could not change the color of the saucepan. The one [I] get now has a lot of smoke, [I] could get good logs before.

(Lilian, 30/1/2017)

From our interviews it appears that the disappearance of traditional fuelwood species and the increasing reliance on pine and eucalyptus has in this way significantly increased the time required to collect firewood. Because the branches are smaller and burn faster, firewood must be collected more often, a burden that usually falls on the women in the community. Referring to the time spent collecting firewood, one woman noted that:

Those days [I] could go two-three times a week. And now [I go] every day.

(Nabasa, 3/2/2017)

Another woman commented that for this reason she is now cooking less often than before, and that her children consequently ate fewer cooked meals. Taken together, this suggests that the efforts of Green Resources to decrease fuel consumption by providing energy-saving stoves, and by handing out seedlings, are largely offset by an overall decrease in the quality of the firewood that people have access to,

which in turn is a direct result of the plantation replacing native vegetation in the forest reserve. While people are (officially) allowed to continue gathering firewood in the reserve as before, this concession obscures a significant degradation in the fuelwood that is available.

5. The benefits that (only) capital can see

KFP is in many ways a rather improbable candidate for a sustainable development project. Even among other CDM forestry projects it stands out for its industrial approach and its near-total exclusion of local communities in its project design, implementation and benefit-sharing (cf. Corbera and Friedli, 2012). Whereas in many other CDM (and VCM) projects local communities at least take a share of carbon revenues and/or forest products, it is Green Resources that claims sole ownership of both the carbon credits and the timber produced through KFP. While the company reinvests 10% of its carbon credit revenue in community development projects, this is a top-down process with little or no opportunities for locals to set the agenda and influence how, when and in what way their ‘development’ occurs. Nor do significant benefits flow to the Ugandan state, seeing how the company leased the reserve for the one-off sum of US\$ 312 and an annual fee of 8900 Ugandan shilling per hectare (approx. US\$ 2.5), excluding those that remain unplanted (Prouty, 2009; our interview with NFA). Together with the government-sanctioned exclusion of people from the reserve, this gives a sense of how the project is governed, where the majority of its benefits are ending up, and ultimately of the extent to which the project operates to the exclusion of local social, political and economic institutions. From this alone, it is clear that the project’s dynamics are far more convoluted and political than a simple focus on ‘win-wins’ suggests (cf. Adams et al., 2004; Muradian et al., 2013).

These tensions are only deepened by the ‘more-than-carbon’ political economies (Asiyanbi, 2016) within which the project is embedded. Oriented towards the simultaneous commodification of timber and carbon, KFP pursues a high-yielding, hierarchical business model centered on a fast-growing monoculture plantation. The diversity of native trees, shrubs and grasses that people relied on for subsistence activities was replaced by rows of pine and eucalyptus. This maximizes the amount of cheap wood and carbon that can be produced within the project’s timeframe, but necessarily abstracts from local environmental conditions and from the manifold other functions that trees, forests and forest resources fulfill, particularly for local communities. The result is not only a reduction in people’s access to land and resources, but also a significant *degradation* of fuelwood sources and grazing opportunities, decreases in soil fertility resulting from intensified use of more marginal lands, and potentially increased pressure on scarce water sources. It is this combination of dispossession and resource degradation that here constitutes the restructuring of landscapes and livelihoods (Leach and Scoones, 2015b), and that in many cases has pushed people deeper into poverty.

KFP thus illustrates the fundamentally *socioecological* character of the tradeoffs at work in industrial carbon forestry. It underscores the dialectical relationship between local livelihoods, resource quality, and plantation forestry as refracted through a number of key subsistence resources. On the one hand, our interviews confirm the thesis that the externally-induced marginalization of rural communities compels them to degrade local resources (Robbins, 2012), as in the case of soil fertility decline induced by decreased land access. But we equally find the inverse relationship, in which processes of ‘green grabbing’ (Fairhead et al., 2012) and ‘carbon commodification’ (Osborne, 2015) themselves emerge as acts of degradation, with direct marginalization effects of their own. In other words, in pursuing an industrial tree plantation within the reserve, Green Resources has created a ‘nature that capital can see’ (cf. Robertson, 2006) that by design degrades local ecologies and therefore at least in part stands in conflict with the needs and priorities of the communities who are dependent on them. The degradation and appropriation witnessed in KFP are not accidents but a

direct result of the forestry model it represents, a model that is functionally blind to the lifeworlds, social activities and ecological processes that do not enter into the two commodities it produces.

The project’s promotion of community development largely takes place in abstraction from these complexities. Its approach to development is focused on handing out seedlings for fast-growing timber trees, providing low-wage labor opportunities, and delivering one-off technical interventions like drilling boreholes or teaching people how to make energy-efficient cooking stoves (Fischer and Hajdu, 2017; Lyons and Ssemwogerere, 2017). The same logic that leads to the simplification and standardization of tree production here effectively creates ‘benefits that capital can see’, quick-fix solutions that boil down complex socioecological and political issues to technological or economic ones, issues that are solvable within the socioeconomic framework in which the company operates, but that obscure and in some ways perpetuate the underlying drivers behind reductions in local living standards. Political, global and structural drivers of poverty largely remain invisible, as do subsistence strategies and resource dependencies that are less easily quantified or standardized. The result is a highly reductionist approach that risks reproducing long-criticized problems in international development projects, often at the cost of the most marginalized and vulnerable groups (Fischer and Hajdu, 2017; Leach and Scoones, 2015b). In line with Osborne and Shapiro-Garza (2018), this is an expected tradeoff of a large-scale industrial and therefore highly commodified carbon forestry project.

A serious evaluation of the project’s promised benefits however can’t ignore changes in local resource access and quality. Given how important land and resources are to livelihoods in the region, it is difficult to see how project actors can propose to foster socioeconomic development without taking this into account. Efforts by Green Resources to provide ‘agricultural support’ and construct local health centers need to be weighed against the project’s effects in terms of land access and concomitant decreases in soil fertility, grazing opportunities and food security. The promotion of energy-efficient cooking stoves loses much of its value if one considers the reductions in fuelwood quality that result from the loss of native shrubs and trees. Similarly, community springs and boreholes are welcome but need to be evaluated against the hydrological impact of the plantation itself. These various tradeoffs do not enter the calculus of project organizers, but they make all the difference in assessing to what extent any improvements in socioeconomic conditions have occurred in the area. This is true also for the creation of employment opportunities in the plantation, described by Green Resources as the project’s main community benefit, but which has done little to reduce communities’ continued resource dependence. Complementing other studies that show plantation workers complaining of low wages,³ piecemeal work and tough working conditions (Lyons and Ssemwogerere, 2017), a number of our interviewees remarked on the mostly seasonal nature of the work (in the rain season) and how this conflicts with labour peaks in subsistence farming activities. Ellingsen (2017) notes that in practice it is therefore mostly the poorest households who are willing to take jobs in the plantation, for lack of alternatives.

It should be acknowledged that about one third of the people we interviewed said they were appreciative of the drilling or restoration of boreholes, the handing-out of seedlings and the employment opportunities that some have gained. But the same people equally dismiss the idea that these constitute significant improvements to their livelihoods, or that they in any meaningful way compensate for the loss of fertile cultivation land, good grazing grounds or the various high-quality fuelwood resources that the plantation has erased. Community members, in other words, are keenly aware of the resources that were traded

³ One man said he earned about US\$ 68 per month, Lyons and Ssemwogerere (2017) give numbers between US\$ 0.5 and US\$ 2.5 per day depending on the nature of the work.

off with the arrival of Green Resources. They do not see the development projects that KFP is responsible for in isolation, but consider them part of their wider, historical and everyday experiences of the project. They measure up the support that the company is providing against the restructuring of local livelihoods in line with market interests, against negative changes in food security and decreased opportunities to send children to school. What in the discourse of Green Resources is a serious effort to provide socioeconomic benefits, to many community members appears rather more like a form of remediation, and an inadequate one at that, for the appropriation and degradation of what they still consider to be rightfully theirs. The socioeconomic benefits that Green Resources sees do not appear the same to those who are meant to benefit from them.

6. Conclusion

As opposed to representing easy win-win opportunities, international conservation/mitigation projects inevitably involve tradeoffs between the processes and relations of commodification, and the delivery of sustainable development benefits to communities in the global South (Adams et al., 2004; Muradian et al., 2013; Osborne, 2015). This is perhaps all the more so in carbon forestry projects, which have direct repercussions for existing land uses and therefore have long proven controversial (Leach and Scoones, 2015a). While some forestry projects evidently have more local benefits than others, the fundamental contradiction between commodification and the pursuit of broader sustainability objectives seems hard to resolve. We have here explored the case of an industrial carbon forestry project to highlight the fundamentally socioecological ways in which this contradiction manifests itself, and therefore the kind of tradeoffs that are generated. We believe this usefully complements existing emphases in the literature on the direct appropriation of land and labour time in carbon forestry projects, the uneven distribution of benefits such as carbon credit revenues, the depoliticization of conservation and development narratives, and wider dynamics of (non-)participation.

Our analysis thus shows how the tradeoffs at work in KFP manifest themselves through the close relationship between rural livelihoods and local resource use. The reworking of local ecologies in line with a cost-effective, reductionist and commodifying logic led to significant resource degradation in and around the Kachung plantation, as evidenced with respect to soil fertility, grazing lands and firewood resources, and as suspected by a number of our interviewees for the water reserve closest to the plantation, a suspicion that clearly warrants closer scrutiny. Combined with the physical exclusion of communities from the forest reserve, this led to a clear deterioration in local livelihoods and an apparent increase in poverty and food insecurity in the area. Green Resources' community development efforts, meanwhile, largely take place in abstraction from these socioecological dynamics. They represent a depoliticized approach to sustainable development (Fischer and Hajdu, 2017) that reduces complex interactions between local ecologies and livelihoods to the kind of 'benefits that capital can see', i.e. technical interventions, seasonal and low-wage job opportunities and pine seedling distribution that above all reflect project actors own priorities and seem inherently unsuited to addressing the problems and concerns experienced and raised by local communities.

Our analysis in this way highlights how a focus on the political ecology of resource degradation in carbon forestry projects helps to broaden perspectives on 'tradeoffs in carbon commodification' (Osborne, 2015). Most directly perhaps, it puts in question the persistent moves by Green Resources and SEA to defer responsibility for deteriorating livelihood outcomes in the area to the Ugandan government, based on the idea that it was the government that expelled people from the reserve and thereby caused a reduction in the land available to communities. But while it is certainly true that the Ugandan government carries large responsibility for the evictions and associated hardship, physical access to the CFR is only one component of the way

in which livelihoods around Kachung have been altered. An equally important factor has to do with the nature of the project itself, i.e. with the choice for a fast-growing and intensely managed tree plantation that has fundamentally transformed local ecologies. It is the project actors that carry responsibility for these activities and their environmental and livelihood impacts. Our research thus suggests that, in evaluating whether or not it should continue to be involved in KFP, SEA needs to go beyond the current focus of the audits it has ordered, and consider the more foundational tradeoffs with the particular carbon forestry model it is financing. Doing so, we believe, would lead them to conclude that there are more effective, just and worthwhile ways to pursue climate change mitigation and/or sustainable development.

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